DMX-CFG-USB

Stepper Driver Configurator/Tester with USB 2.0 Communication

First edition, March 2008

Revision History:

1.0 – First revision
1.01 – Manual Update
1.02 – Manual Revision
1.03 – Manual Revision
1.04 – Updated section numbering, updated 2-pin voltage spec

Firmware Compatibility:

V101

Software Compatibility:

V106

Table of Contents

1. Introduction

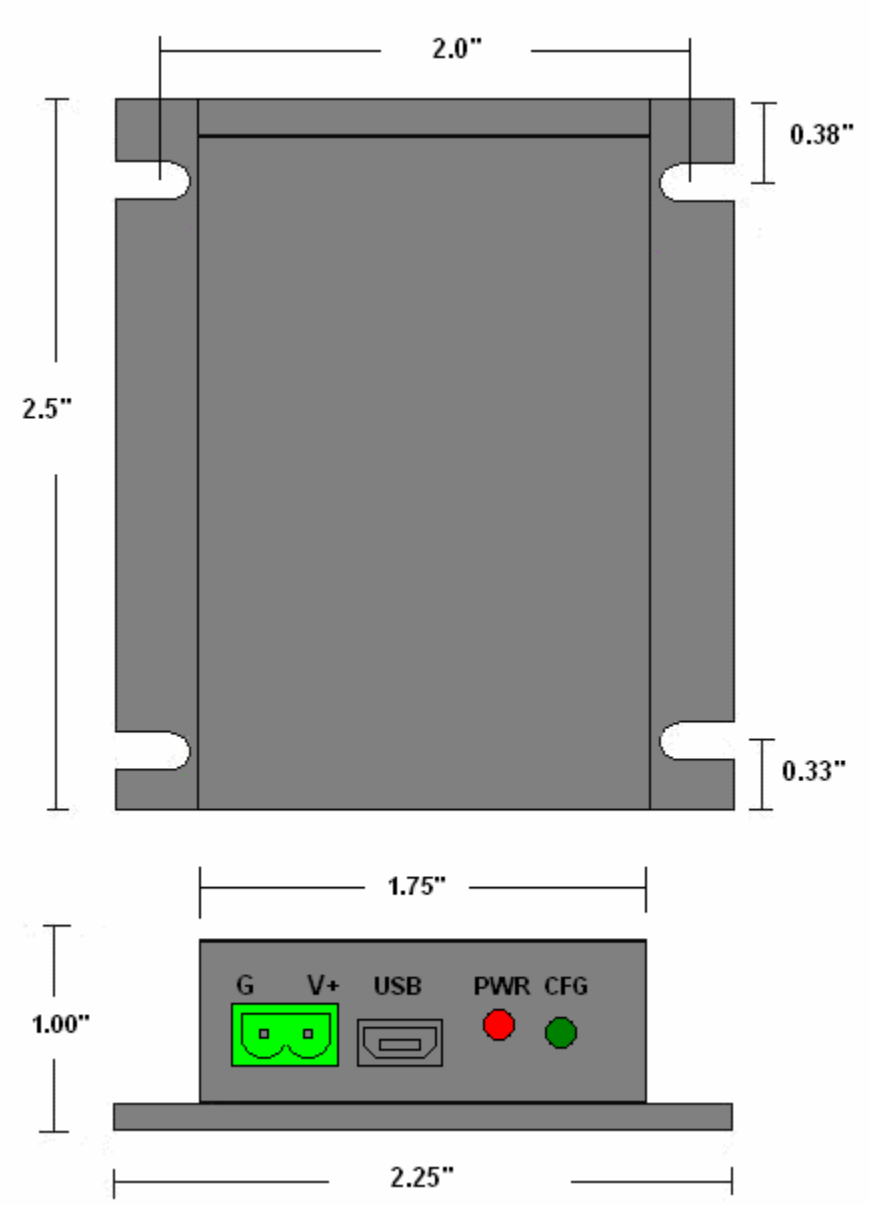
DMX-CFG-USB is a stepper driver configuration for the following Arcus motion products:

- DMX-K-DRV series
- DMX-A2-DRV series
- ACE-SDX

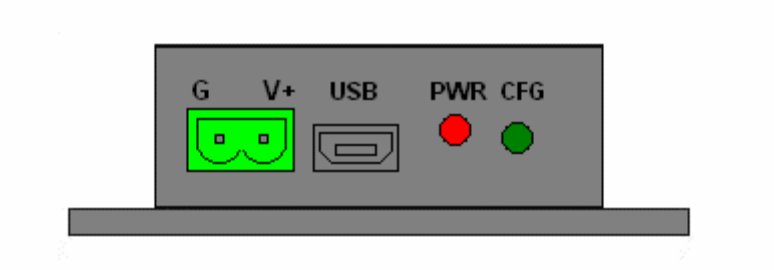
DMX-CFG-USB has following features:

- USB 2.0 Communication
- 12-24VDC voltage input
- PC based configuration or standalone configuration
- Driver parameters saved on Flash for standalone configuration
- Simple pulse generator to test the stepper driver performance

2. Dimensions



3. Connectors

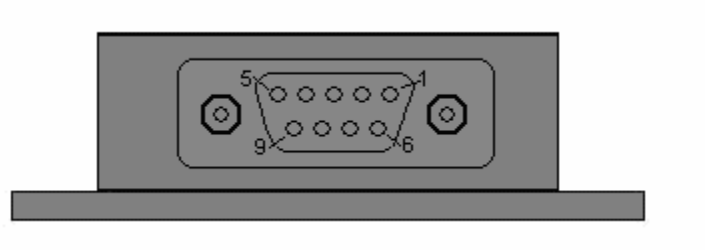


2 pin Connector Information

Pin #	Name	Description
1	G	Ground
2	V+	Power Input +12 to +24VDC

Mating Connector Description: 2 pin 0.2” (5.08mm) connector
Mating Connector Manufacturer: On-Shore
Mating Connector Manufacturer Part: EDZ950/2

Note: Other 5.08mm compatible connector can be used.



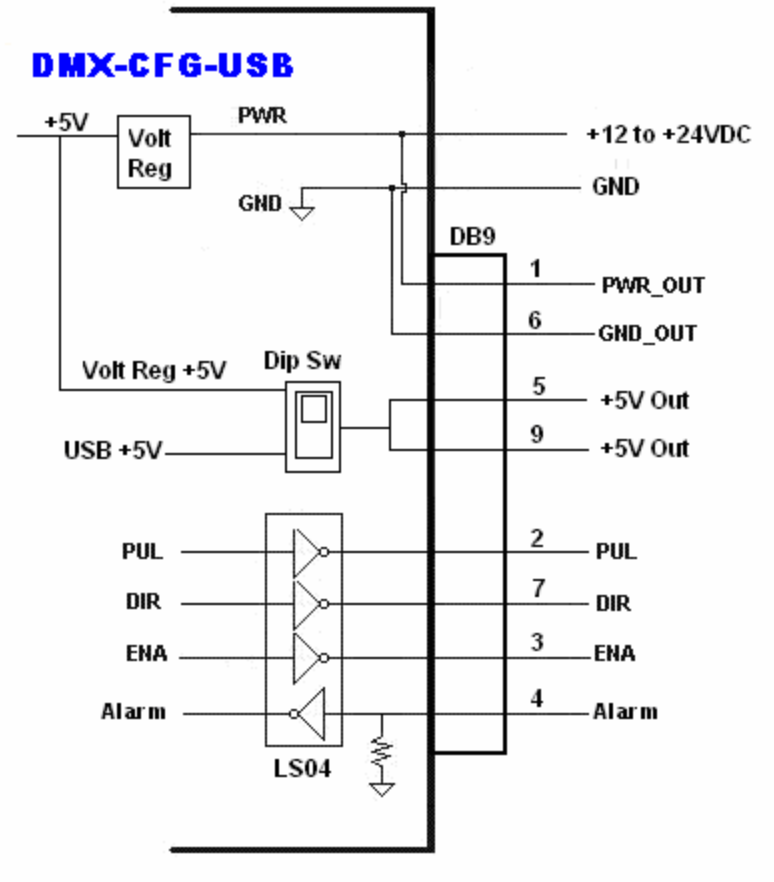
DB9 Connector Information

Pin	*Name*	*Type*
1	PWR	OUT
2	PUL	OUT
3	ENA	OUT
4	ALM	IN
5	5V+	OUT
6	GND	OUT
7	DIR	OUT
8	NC	OUT
9	5V+	OUT

Mating Connector Description: DB9 Male

4. Electrical Specifications

Internal Interface Circuit Overview

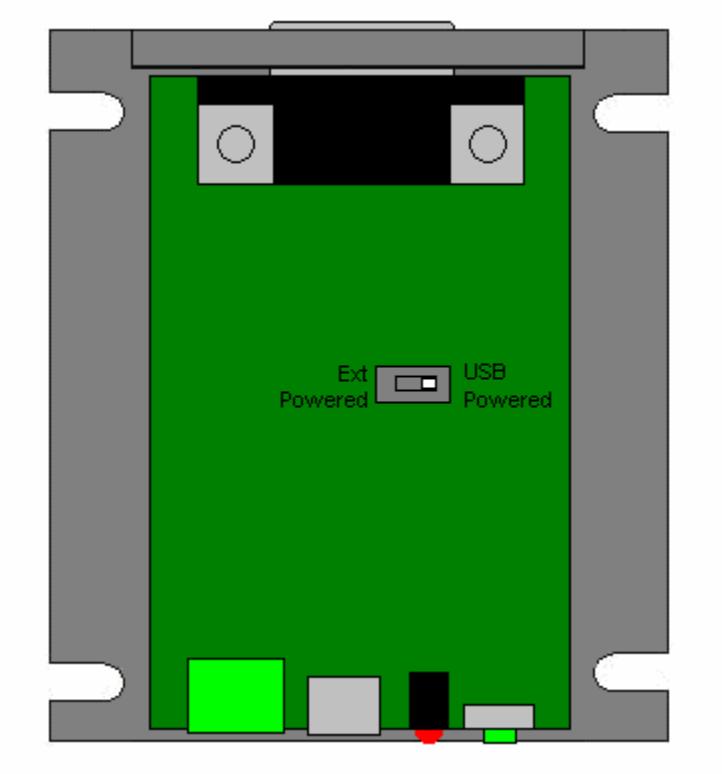


Power Input

Depending on the dip-switch setting, the power to the DMX-CFG-USB unit can be from an external power source or a USB +5V power source.

Factory default setting is the external power source.

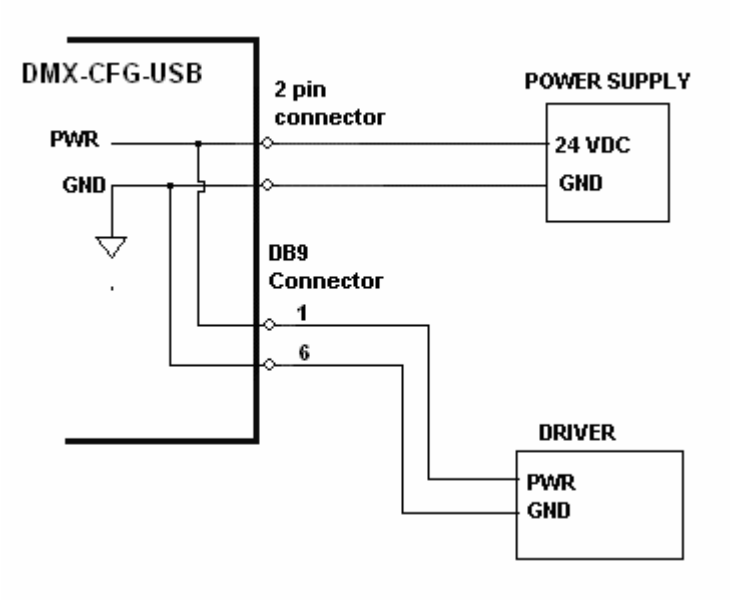
To change the power input selection, open the cover and set the dip switch accordingly.



To use USB power, select the dip switch to the right.
To use external power, select the dip switch to the left.

Regulated Supply Voltage Range:	**+12 to 24 VDC**
Recommended Current for power supply:	**100 mA** (Current required for powering the DMX-CFG-USB. If driver is powered through DB-9 additional current is required to power the driver.)

Power and ground signals that are supplied to DMX-CFG-USB through 2 pin connector are also available through the DB9 pin connector.



Communication:

Communication:	**USB 2.0**
Connector:	**Mini-B to A**

Pulse, Direction and Enable Outputs

Pulse/Dir/Enable Outputs are buffered through 74LS04.

Alarm Input

Alarm input is a TTL compatible input buffered through 74LS04 with pull down resistor.

Operating Temperature

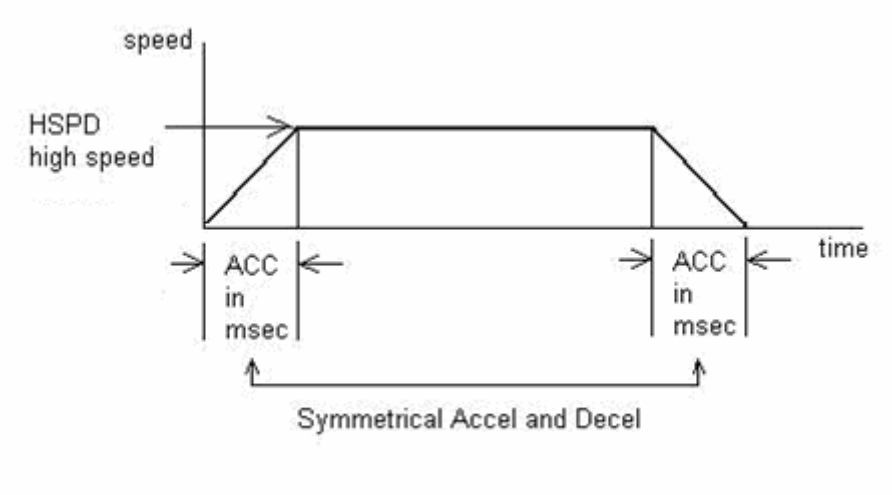
Electronic components used in DMX-CFG_USB have maximum ambient operating temperature of **85 degree Celsius**.

5. Motion Control Overview

DMX-CFG-USB has simple pulse generator to test the motion of the driver.

Motion Profile and Speed

DMX-CFG-USB incorporates trapezoidal velocity profile as shown below.



High speed and low speed are in pps (pulses/seconds). Use the **HSPD** and **LSPD** commands to set and retrieve the high speed and low speed settings. The supported pulse output rate is from 1 to 16K pulses/second.

Acceleration and deceleration time is in milliseconds and are symmetrical. Acceleration range is from 10 msec to 300 msec. To configure the acceleration, use the **ACC** command.

Position Counter

DMX-CFG-USB has 32 bit signed position counter. Range of the position counter is from –2,147,483,648 to 2,147,483,647.

Target Move

Target move, also known as absolute move, is used to move the motor to the desired position from the current position. Use the **X** command to make moves.

Jog Move

Jog move is used to continuously move the motor without stopping and is performed using the **J+/J-** command.

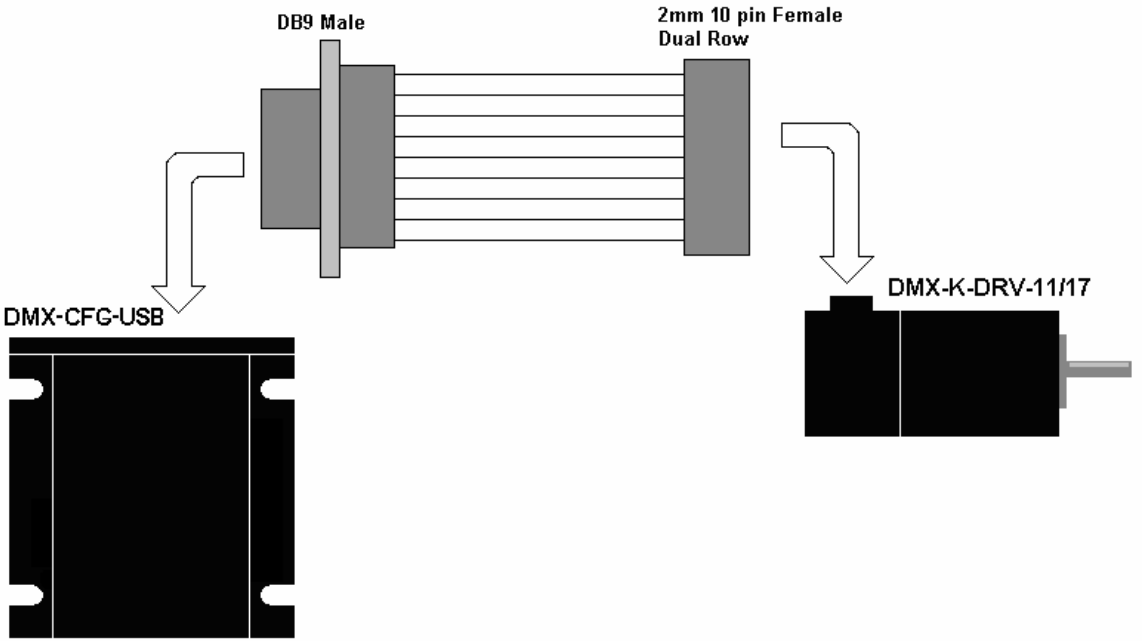
Stopping Motor

When motor is moving, jogging, motion can be stopped abruptly or with deceleration. It is recommended to use decelerate and stop command so that there is less impact to the system. To stop abruptly, use the **ABORT** command. To stop with deceleration, use the **STOP** command.

6. Connecting to DMX-K-DRV, DMX-A2-DRV, and ACE-SDX

Connecting DMX-CFG-USB to DMX-K-DRV-11/17

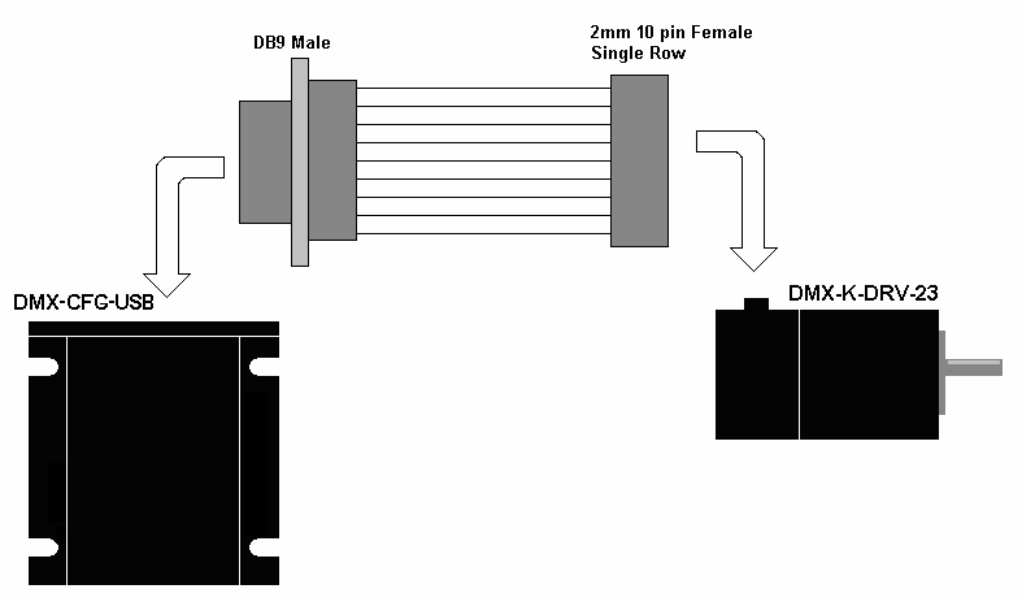
Cable Accessory: **CBL-DB_9M-DF11_10F-L1-G22-V1**



Pin Description	DB9 Male Connector Pin Number	2mm 10 pin dual row connector Pin Number
PWR	1	10
PUL	2	1
ENA	3	6
ALM	4	8
5V+	5	NC
GND	6	9
DIR	7	3
NC	8	NC
5V+	9	2, 4, 5

Connecting DMX-CFG-USB to DMX-K-DRV-23

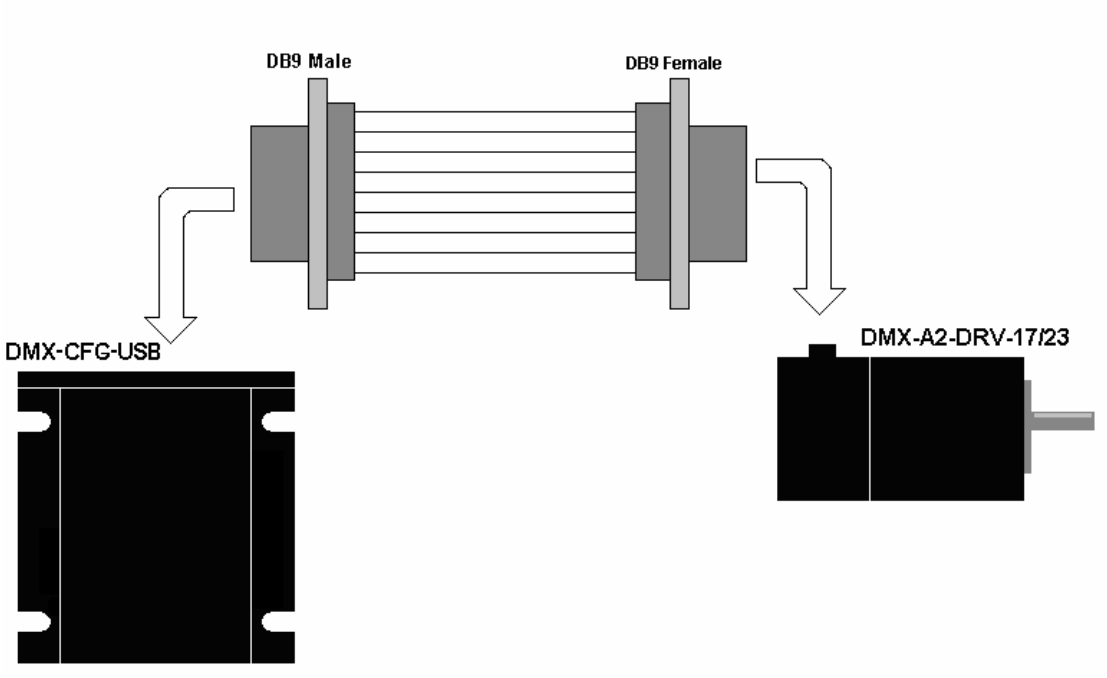
Cable Accessory: **CBL-DB_9M-DF3_10-L1-G22-V1**



Pin Description	DB9 Male Connector Pin Number	2mm 10 pin single row connector Pin Number
PWR	1	2
PUL	2	9
ENA	3	5
ALM	4	4
5V+	5	NC
GND	6	1
DIR	7	7
NC	8	NC
5V+	9	6, 8, 10

Connecting DMX-CFG-USB to DMX-A2-DRV-17/23

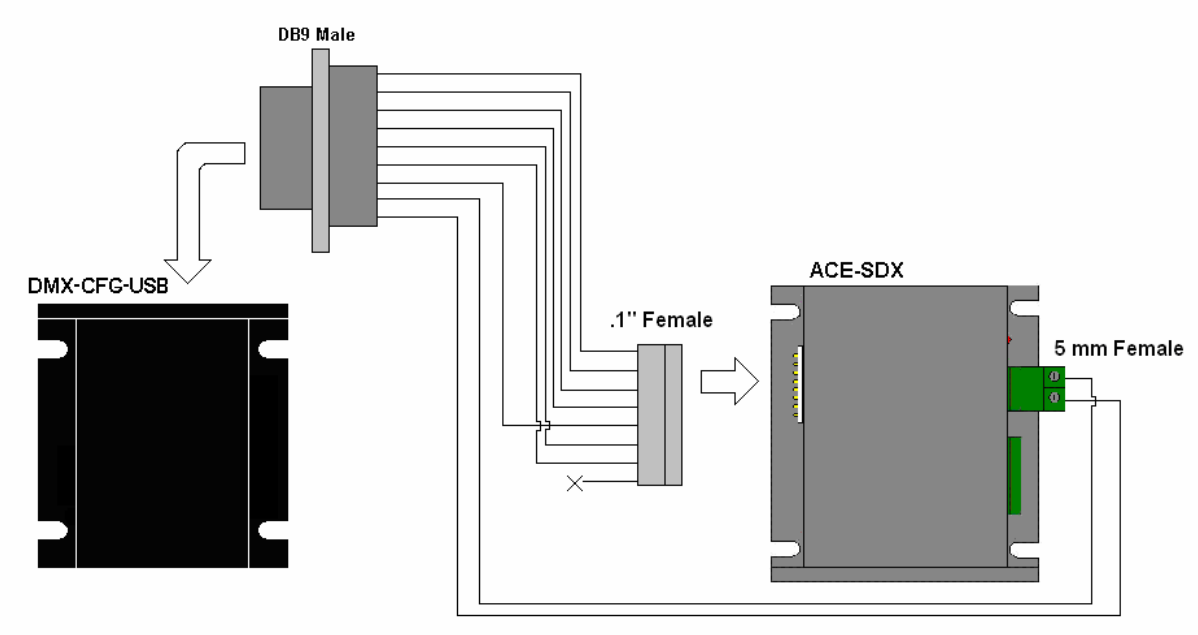
Cable Accessory: **CBL-DB_9M-DB_9F-L1-G22-V1**



Pin Description	DB9 Male Connector Pin Number	DB9 Female Connector Pin Number
PWR	1	1
PUL	2	2
ENA	3	3
ALM	4	4
5V+	5	5
GND	6	6
DIR	7	7
NC	8	8
5V+	9	9

Connecting DMX-CFG-USB to ACE-SDX

Cable Accessory: **CBL-DB_9M-I_8F-L1-G22-V1**



Pin Description	DB9 Male Connector Pin Number	0.1” Female 8 pin Connector Pin Number	5mm Female 2 pin Connector Pin Number
PWR	1	NC	2
PUL	2	2	NC
ENA	3	6	NC
ALM	4	7	NC
5V+	5	NC	NC
GND	6	NC	1
DIR	7	4	NC
NC	8	NC	NC
5V+	9	5, 3, 1	NC

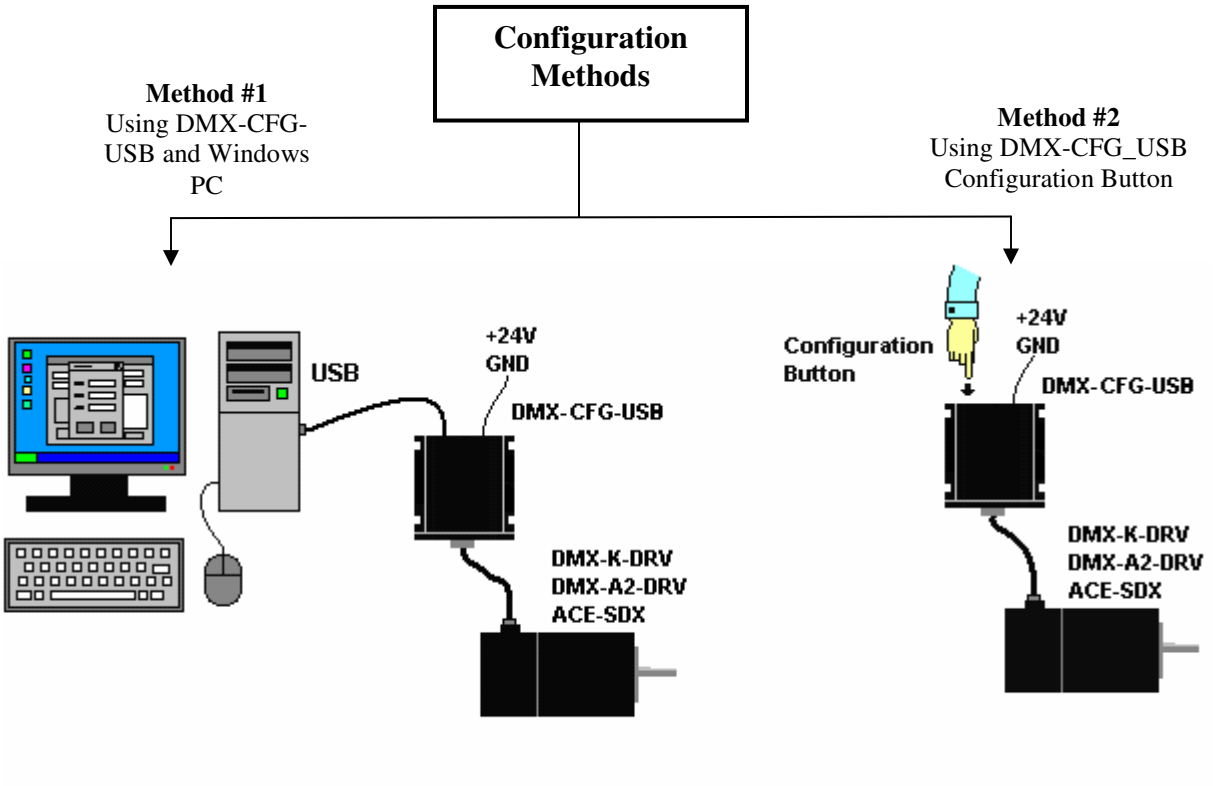
7. DriveMax Configuration

DMX-CFG-USB can be used to configure the driver settings for the following products.

DMX-K-DRV-11/17/23
DMX-A2-DRV-17/23
ACE-SDX

DMX-CFG-USB uses patent pending Dynamic Configuration method of reading and writing of the driver setting through control lines: PULSE/DIR/ENABLE/ALARM.

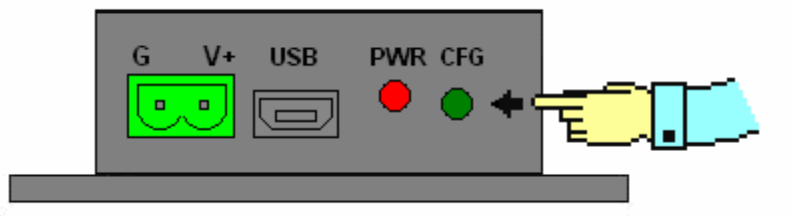
There are two ways to configure the DMX-K/DMX-A2/ACE-SDX using DMX-CFG-USB.



Configuration Method #1 – Using Windows PC

Method #1 uses the Windows PC using the DMX-CFG-USB GUI program to upload and download the driver parameters. For detailed description, refer to the DMX-CFG-USB GUI section on driver configuration.

Configuration Method #2 – Using the Configuration Button



Method #2 uses the configuration button on the DMX-CFG-USB controller to download the driver parameters. Note that configuration button is used only for downloading the driver parameters that have been stored on the DMX-CFG-USB controller.

On the DMX-CFG-USB controller, the driver type needs to be stored on the flash so that when the button configuration is used, correct driver configuration is done. There are two types of driver type for button configuration: 1) K-DRV and 2) A2-DRV/ACE-SDX.

Once the correct driver type is selected and the driver parameter values are stored on the flash memory of DMX-CFG-USB controller, driver parameters can be downloaded from DMX-CFG-USB without the use of Windows PC using the configuration button on the DMX-CFG-USB. To configure the driver through the configuration button follow the steps below.

1) Power the DMX-CFG-USB controller using 24VDC power supply.
2) Connect the control cable between DMX-CFG-USB and DMX-K-DRV/DMX-A2-DRV/ACE-SDX. All the control signals (Pulse/Dir/Enable/Alarm) must be connected to work properly.
3) Press and hold down the configuration button for 3 seconds. The LED on the DMX-CFG-USB controller will start blinking quickly indicating that the configuration is ready to start.
4) While the LED is blinking quickly, release the button and press the button again to start the configuration of the connected driver. While the configuration is processing, the LED is turned off. Configuration takes about 3 seconds. If the configuration button is not pressed again within 3 seconds during its quick blinking state, the LED will stop blinking and configuration will be aborted.
5) If the configuration is done properly, the LED will blink quickly for 3 seconds. If the configuration is not done properly, LED will blink slowly for 3 seconds.

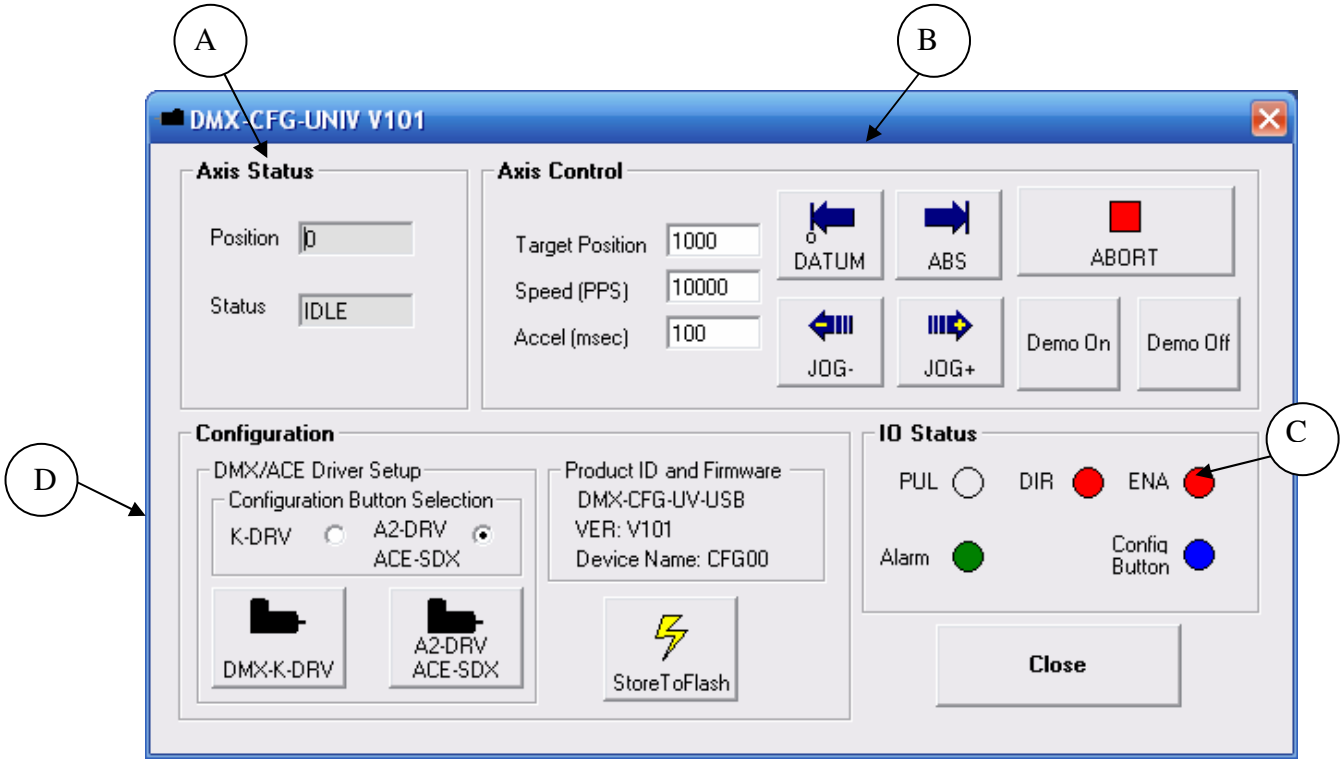
8. DMX-CFG-USB GUI Windows Program

The DMX-CFG-USB comes with a Windows GUI program to read and configure driver settings of DMX-K-DRV, DMX-A2-DRV, and ACE-SDX. Simple motion control feature allows quick testing of the driver.

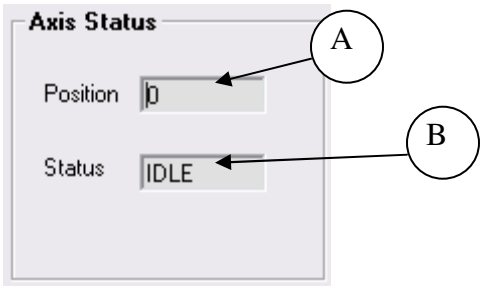
Important Note: In order to communicate with DMX-CFG-USB through USB, proper driver must be installed first. Before connecting the DMX-CFG-USB device or running any program, please go to the Arcus web site and download the USB driver installation instruction and run the USB Driver Installation Program.

Make sure that the USB driver is installed properly before running the controller.

Startup the DMX-CFG-USB GUI program and you will see following screen.

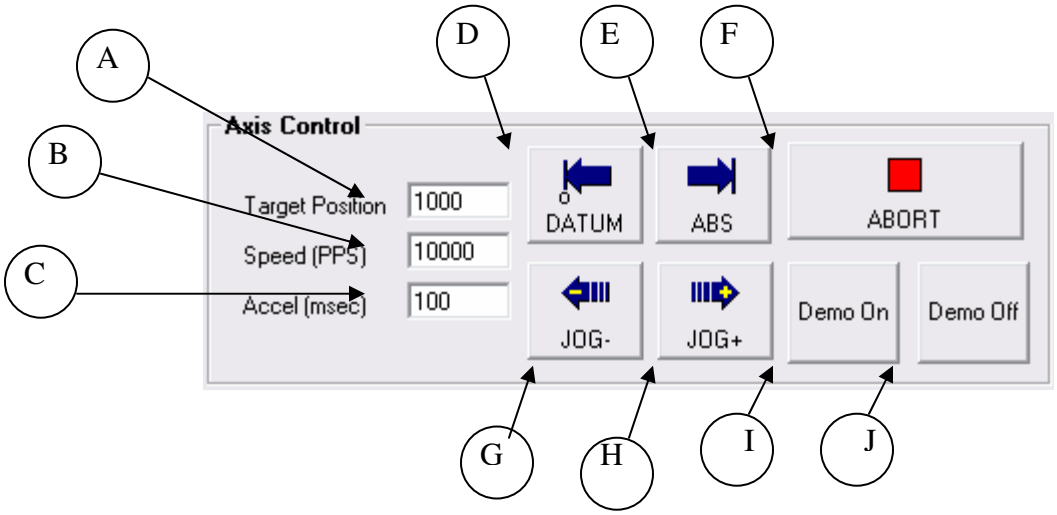


Axis Status



A. Position – Display of the current motor position counter value
B. Status – Display of the current motor status. Possible values are
ACCEL – acceleration in progress
CONST – constant speed in progress
DECEL – deceleration in progress
IDLE – idle

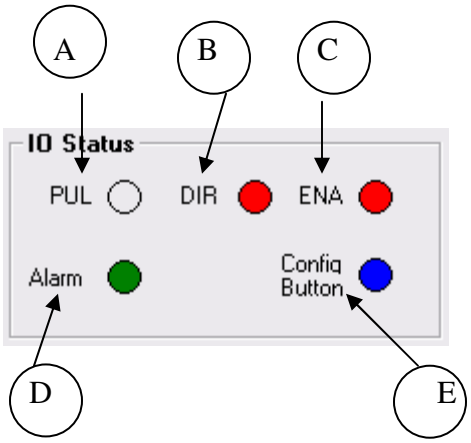
Axis Control



A. Target Position – Target position to move to for ABS move.
B. Speed – Speed Value. Range from 1 to 16,000.
C. Acceleration – Acceleration Value. Range from 10 to 300.
D. DATUM – Absolute move to zero position.
E. ABS – Absolute move to target position.
F. ABORT – Immediate stop
G. JOG- - Jog to minus direction
H. JOG+ - Jog to plus direction
I. Demo On – Performs continuous back and forth motion between the target position and the zero position
J. Demo Off – Turns off the demo

Note: When move command is issued, make sure that the driver is enabled.

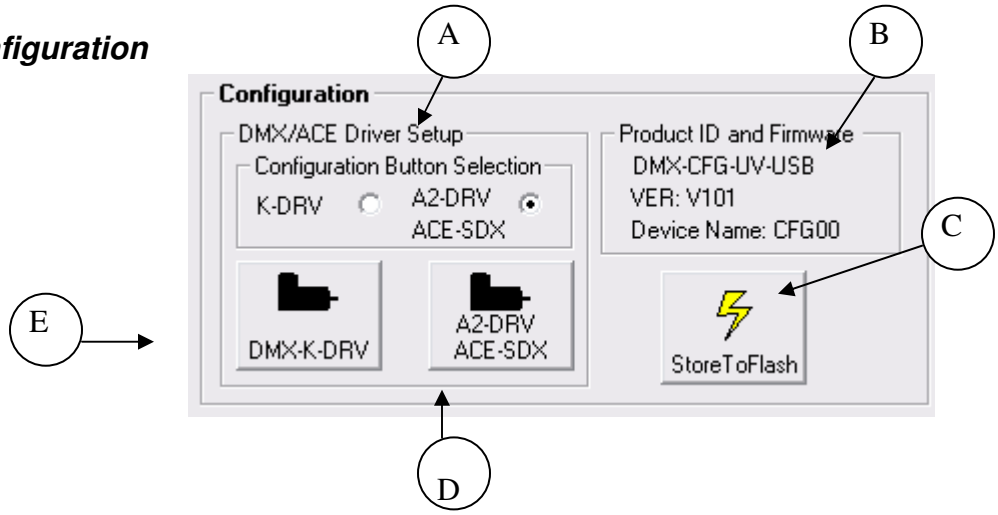
IO Control



A. PUL – Pulse Output status
B. DIR – Direction Output status.
C. ENA – Enable Output status.
D. ALARM – Alarm Input status.
E. Config Button – Configuration Button Input status.

Note: Outputs can be toggled by clicking on the output circle.

Configuration



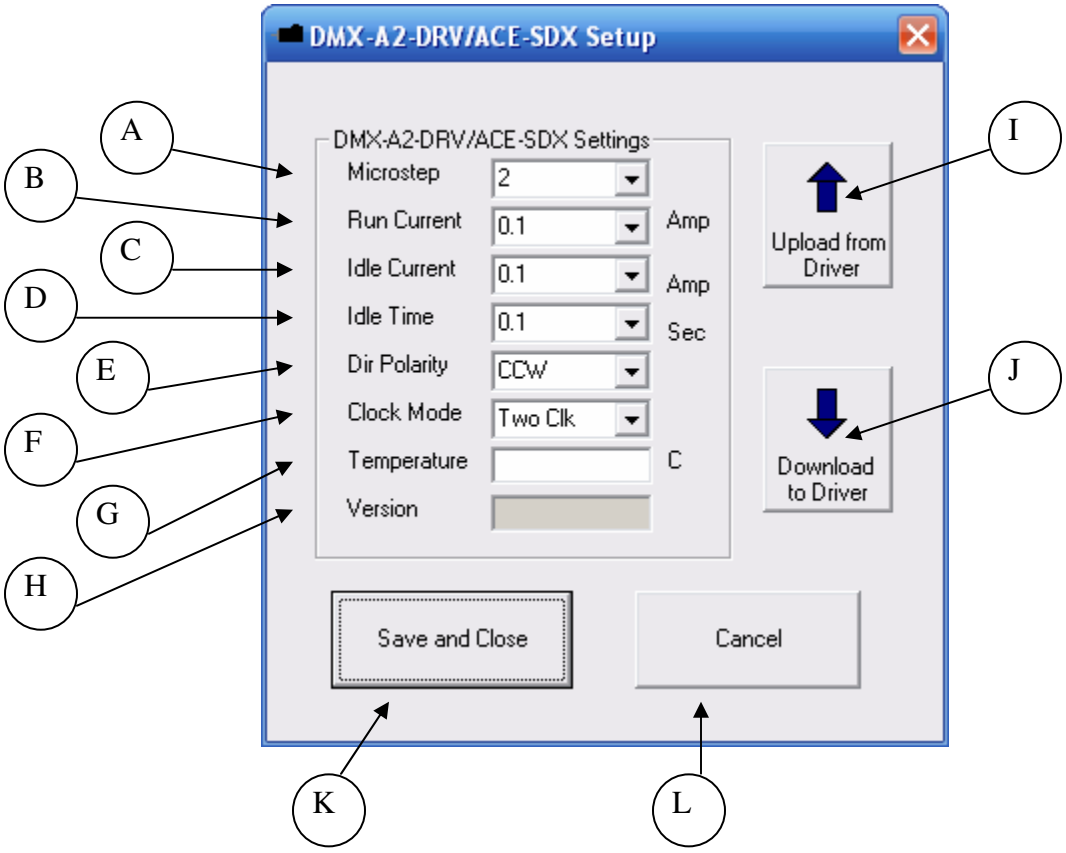
A. Configuration Button Selection – Configuration button is used to download the driver parameters without the use of the Windows PC. With the controller powered and connected to DMX-K-DRV, DMX-A2-DRV, or ACE-SDX, the driver configurations on the controller can be downloaded to the driver by using the configuration button. A2-DRV and ACE-SDX use the same driver parameter settings and are grouped together as one type. Select the driver type that will be used with the configuration button and, once selected, store to the flash memory so that the driver type and driver parameters to be used will be stored to the controller.

B. Product ID and Firmware – Product ID and firmware is shown to confirm the DMX-CFG-USB product. Firmware version loaded on the DMX-CFG-USB is shown

C. Store To Flash – Parameters are permanently stored on the flash memory. When the unit is powered, the parameter values stored on the flash is loaded and used. Following are parameters that are stored on the flash.

D. DMX-A2-DRV/ACE-SDX Configuration –

When DMX-A2-DRV/ACE-SDX button is selected, the following configuration dialog box is opened. From this dialog box, driver settings can be uploaded or downloaded. Note that Temperature (showing the current driver temperature as detected) and Version can only be uploaded.



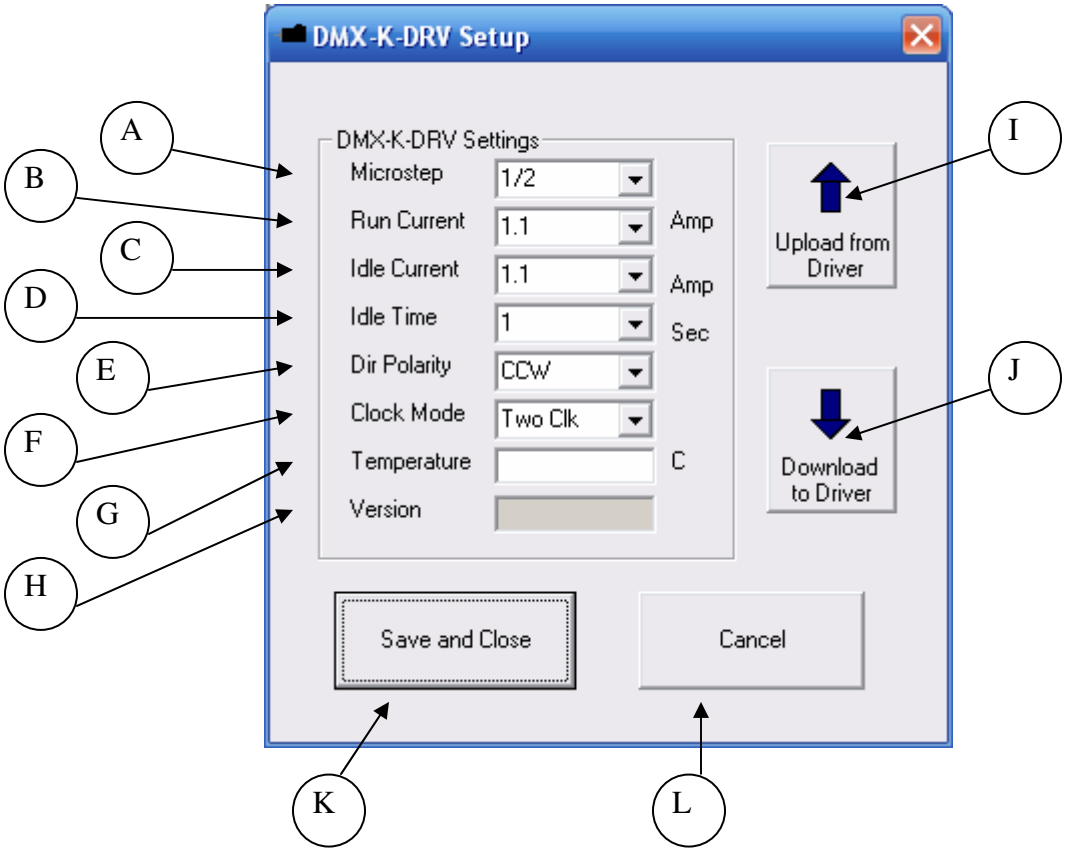
A. Microstep – Microstep range is any value from 2 to 500 microstep.
B. Run Current – Run current is the current used when the pulse is detected and the motor is moving. Range is from 100mA to 3.0A.
C. Idle Current – Idle current is the current used when the pulse is not detected for the duration of the idle time at which time the current is dropped to the idle current. Idle current is used to reduce the heat generated by the stepper motor.
D. Idle Time – Idle time is used as the duration time required for dropping the current from the run current to the idle current.
E. Dir Polarity – Direction polarity is used to set the rotational direction of the stepper motor.
F. Clock Mode – Driver supports both one clock (Pulse/Dir) or two clock (CW/CCW) outputs from the controller.
G. Temperature – Current driver temperature of the driver is read.
H. Version – Current driver firmware version of the driver is read.

I. Upload from Driver – Driver parameters are uploaded from the connected driver.
J. Download to Driver – Driver parameters are downloaded to the connected driver.
K. Save and Close – Driver parameters selected on the dialog box is downloaded to the DMX-CFG-USB. Note that the parameters are NOT downloaded to the driver but only to the DMX-CFG-USB.
K. Cancel – Close the setup dialog box without saving the parameters.

NOTE:
** Once the parameters are downloaded to the driver, the parameters are stored on the Flash of the driver.*
** When **Save and Close** button is used, the parameters on the dialog box are downloaded to the DMX-CFG-USB and not the driver. The values are stored on the RAM. To permanently store the value to the flash, perform the **Store To Flash** operation.*

E. DMX-K-DRV Configuration –

When DMX-K-DRV button is selected, following configuration dialog box is opened. From this dialog box, driver settings can be uploaded or downloaded. Note that Temperature (showing the current driver temperature as detected) and Version can only be uploaded.



A. Microstep – Microstep range is of the following values: Full, ¼, 1/8, 1/16.
B. Run Current – Run current is the current used when the pulse is detected and the motor is moving. Range is from 100mA to 2.5A.
C. Idle Current – Idle current is the current used when the pulse is not detected for the duration of the idle time at which time the current is dropped to the idle current. Idle current is used to reduce the heat generated by the stepper motor. Range is from 100mA to 2.5A.
D. Idle Time – Idle time is used as the duration time required for dropping the current from the run current to idle current.
E. Dir Polarity – Direction polarity is used to set the rotational direction of the stepper motor.
F. Clock Mode – Driver supports both one clock (Pulse/Dir) or two clock (CW/CCW) outputs from the controller.
G. Temperature – Current driver temperature of the driver is read.
H. Version – Current driver firmware version of the driver is read.

I. Upload from Driver – Driver parameters are uploaded from the connected driver.
J. Download to Driver – Driver parameters are downloaded to the connected driver.
K. Save and Close – Driver parameters selected on the dialog box is downloaded to the DMX-CFG-USB. Note that the parameters are NOT downloaded to the driver but only to the DMX-CFG-USB.
K. Cancel – Close the setup dialog box without saving the parameters.

NOTE:
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** When **Save and Close** button is used, the parameters on the dialog box are downloaded to the DMX-CFG-USB and not the driver. The values are stored on the RAM. To permanently store the value to the flash, perform the **Store To Flash** operation.*

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